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Museum has been undergoing the necessary alterations so that it may now be used for museum purposes as was originally designed. The building is being thoroughly repaired, a modern lighting system is being installed, and much material of unique scientific value, which has never before been displayed through lack of space, is now being arranged for permanent exhibition. The director of the museum, which contains more than a million specimens, is Dr. T. C. Chamberlin, head of the department of geology; and the associate directors are Frederick Starr in anthropology, Stuart Weller in invertebrate paleontology, and Samuel Wendell Williston in vertebrate paleontology.

THE University of Illinois is completing arrangements for the construction of a new genetics building. It will contain offices for Dr. J. A. Detlefson and Mr. Elmer Roberts and two laboratories—one for general genetics and the other for animal nutrition with classroom accommodations. When completed the building will be one story in height, 140 feet by 42 feet in width, and will cost approximately $10,000.

BY the will of Mr. W. Jackson, engineer, of Aberdeen, funds are left, subject to his wife's life interest, for the establishment of a chair of engineering in the University of Aberdeen.

PROFESSOR JULIUS STIEGLITZ has been made chairman of the department of chemistry of the University of Chicago to succeed the late Professor John Ulric Neff.

THE Harvard corporation has made the following appointments for the year opening September 27: Dr. John L. Morse, associate professor of pediatrics, has been made full professor; Dr. Frederick T. Lewis, assistant professor of embryology, has been appointed associate professor; Dr. John Warren, assistant professor of anatomy, has been made associate professor; Dr. John L. Bremer, assistant professor of histology, has been made associate professor; Dr. Francis W. Peabody has been appointed assistant professor of medicine and Dr. Herbert S. Langfeld, assistant professor of psychology.

APPOINTMENTS in the department of agronomy at the Iowa State College for the year include: Ross L. Bancroft, M.Sc. (University of Wyoming and Iowa State College), assistant professor of soils; H. W. Johnson, M.Sc. (Iowa State College), instructor in soils and assistant in soil bacteriology; F. S. Wilkins, M.Sc. (University of South Dakota and Iowa State College), instructor in farm crops, and Roy Westley, B.Sc. (Iowa State College), instructor in farm crops.

PROFESSOR A. B. PLOWMAN, PH.D. (Harvard), has taken up his work as head of the department of biology, in the Municipal University of Akron, Ohio.

PROFESSOR WILLSTAETTER, member of the Kaiser Wilhelm Institute for Chemistry, has been made professor of chemistry at the University of Munich.

DISCUSSION AND CORRESPONDENCE

POTASSIUM FROM THE SOIL

BULLETIN 182 of the Illinois Experiment Station by Hopkins and Aumer, brings, under the above caption, the results and discussions of a three-year course of experimentation in the growing of crop plants in the "insoluble residue" left after digestion, according to the "official method," for ten hours in HCl of 1.115 sp. g., of a "normal" soil from the Illinois corn belt, of good productiveness. The authors recall that in bulletin 123 of their station it had already been shown that this method of digestion extracted only 15 to 25 per cent. of the total potassium present, as determined by the method of fusion. In the present series of tests it was clearly shown that red clover was able to take from the insoluble residue sufficient potassium to supply a normal crop, so long as nitrogen and phosphorus were adequately present; thus illustrating the futility of the "official method."

It seems proper now to recall to mind that in the early seventies, Loughridge at my suggestion made an elaborate investigation of the effects of the digestion of a "normal" soil with

acids of different strengths, and for different times. The results of this investigation were published in 1873, in the *American Journal of Science,* and in the *Proceedings* of the American Association for the Advancement of Science, having been read before that association. It was conclusively shown that there was a steady increase in the extraction of potassium for *five* days, remaining stationary afterwards, the amount extracted during the first twenty-four hours being about one half of the final figure, while phosphorus, lime and magnesia were fully extracted.

Notwithstanding this demonstration, fully published in two standard publications, a number of years later the "Official Chemists," in a meeting at Washington, hastily adopted, against my protest, the arbitrary ten-hours digestion proposed by Kedzie, as the official method to be used in state and government work.

It is no wonder that as a result of this irrational practise, chemical soil analysis became more and more discredited as a means of ascertaining the quality and permanent productiveness of soils. In cases where potassium was in abundant supply, it gave results corresponding to the field tests because of the complete extraction of phosphates, lime and magnesia during the ten hours' digestion. On the other hand, where potassium was deficient, no definite relation between the analysis and practise *could* appear.

But when Hopkins goes so far as to determine the potassium content by the fusion method, thus decomposing all the resistant silicates, feldspar-sand, etc., as well as the easily decomposable zeolitic minerals, he goes far beyond the limits within which any definite correlation between soil composition and vegetative action is to be expected; and whatever conclusions are based upon such analyses are practically groundless. Knowing as we do that the assimilation of inorganic substances from the soil by plants is mediated by *acid* solvents, whether derived from the air, from vegetable decay, from secretion by plant roots or bacteria, it certainly is most rational to ascertain how far *acid* action can go in the soils under examination. *This* limit, and no arbitrary rule of time, or ultimate analysis, must serve as the basis of judgment for practical comparison of soil values, or producing capacity. Hopkins's own experiments on the growth of plants in the undissolved residue from the "official" analysis simply corroborate what had been abundantly shown by Loughridge's work in 1873, but prove nothing against the practical value of soil analyses properly made. They do throw discredit upon the "official method," so far as potassium is concerned.

But soil chemists would feel additionally indebted to Hopkins if he would undertake to supplement the somewhat gratuitous proof he has given of the inadequacy of the official method, by growing plants on the residue from a digestion carried to the limit of acid-solubility; which in the case of the soil selected by Loughridge and myself we found to be five days for acid of the accepted sp. g. of 1.115. I have long desired to make this crucial test, but have not been able to find the time or means to do so. If an Illinois soil can thus be made to yield to any plant a practically important amount of potassium, it will be very desirable to know it and thus put an end to farther controversy in the matter; while rendering an important service to soil investigation and plant physiology.

E. W. Hilgard
University of California,
September 10, 1915

Elementary Mechanics

To the Editor of Science: There have appeared in your pages recently a number of contributions by various authors to the discussion of the dynamical equation $ma = f$ or some of its possible variants. It seems as though it would be necessary, for a complete discussion of the relative merits of the different ways of introducing a student to the dynamical equation cited, to enter at least briefly upon the matter of the student's previous training in mechanics. We are all aware that it is at present somewhat stylish to begin the study of mechanics with kinetics and to treat statics as a special case in which the accelerations are